BEFORE THE

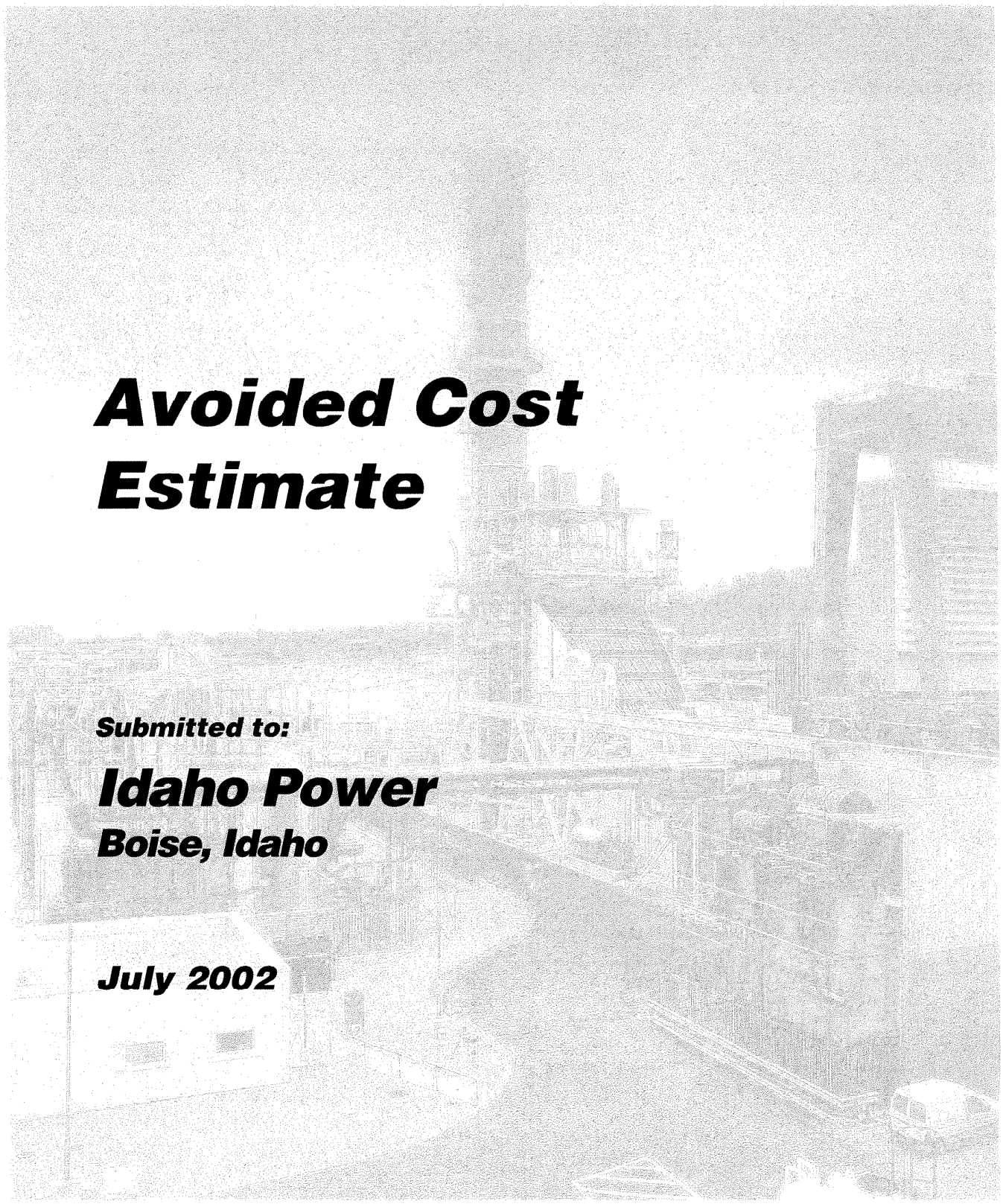
IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. GNR-E-02-1

IDAHO POWER COMPANY

EXHIBIT NO. 102

JAY K. JOHNSON



Avoided Cost Estimate

Submitted to:

Idaho Power
Boise, Idaho

July 2002

PB Power
A Parsons Brinckerhoff Company

AVOIDED COST ESTIMATE

The purpose of this report is to develop a capital cost estimate, O&M cost estimate and performance estimate for a generic, base loaded, combined cycle plant located in Idaho Power Company's load center near Boise, Idaho. These estimates in conjunction with fuel cost projections are used to form the basis for calculating the utilities avoided cost. Fuel costs are estimated in a separate report prepared by URI. The plant configuration assumed for calculating the avoided cost is a 1X1 GE Frame 7FB combined cycle plant located near Boise, Idaho. The GE Frame 7FB offers improved efficiency and more output over its predecessor the 7FA. The plant is configured as a base loaded facility without duct firing. A general description of the facility is included as attachment 1.

Two cooling options were considered. The first was a conventional multiple cell, forced draft cooling tower. The second option was an air cooled condenser, which minimizes the water used by the facility. The conventional cooling tower provides the best performance at the lowest cost, since it uses the wet bulb temperature of the air as heat sink. The air cooled condenser uses the higher dry bulb temperature as the heat sink.

CAPITAL COST

The capital cost of the facility was calculated using Thermoflow's PEACE software adjusted for site specific conditions and adjusted for historical cost data for similar size projects. The cost estimate includes all costs associated with the permitting, financing, construction and commissioning a facility of this type. In addition, an allowance of $7,000,000 was included to cover interfaces such as the gas interconnect and electrical interconnect. Since the site was somewhat generic in nature, actual interconnect costs will vary.

Two capital cost estimates were developed, one for the water cooled option, the other for the air cooled option. The air cooled option has a higher installed cost and will require approximately one additional acre for the air cooled condenser. A detailed breakdown of the two capital cost estimates is included as attachment 2.

The capital cost was then amortized over thirty years at a discount rate of 9.199% resulting in annual payments of $17.2M for the cooling tower option and $18.0M for the air cooled option. Dividing the annual payment by the estimated annual power produced by the base loaded facility results in the capital cost component of the avoided cost. The total estimated annual power output for the facility was adjusted by the availability factor of 92% and the degradation factor of 2%. No allowance was included for land, land lease, taxes or depreciation in this estimate.

It should be noted that the cost of this facility will be higher on a cost per kilowatt basis when compared to a conventional merchant plant. The primary reason for this is that a conventional merchant plant is generally configured on a two on one basis (two combustion turbines and one steam turbine) rather than the one on one basis (one combustion turbine and one steam turbine) proposed for this facility.

The estimated capital cost of the facility based upon the annual average power output is as follows:

Wet Tower	**$686/kW**
Dry Tower	**$729/kW**

PERFORMANCE

The performance of the facility was calculated using Thermoflow's software after configuring the cycle using a GE Frame 7B gas fired combustion turbine. The cooling cycle was optimized based upon the 2.5% heating day as defined by ASHRAE for the Boise area. Heat balances were prepared for four ambient conditions for the Boise area: average low temperature, average high temperature, average annual temperature and ISO conditions all adjusted for elevation of Boise. Performance data was developed for both the cooling tower option and the air cooled option. The heat balances are included as attachment 3.

In order to calculate the fuel component of the avoided cost, the fuel cost is multiplied by the average annual heat rate of the facility. A degradation factor of 1.75% was applied to the heat rate to account for normal degradation of the combustion turbine.

The calculated heat rates with degradation based upon average annual conditions are as follows:

Wet Tower	**6899 Btu/Kwhr HHV**
Dry Tower	**6994 Btu/Kwhr HHV**

OPERATIONS AND MAINTENANCE

The annual O&M costs were calculated using a proprietary spreadsheet specifically created for power plants of this size. A long term maintenance agreement was included to account for the overhaul and maintenance costs associated with the gas turbine. Fixed and variable costs were calculated in 2002 dollars and do not include escalation. Water was assumed to be provided at no cost to the project. The O&M spreadsheets are included as attachment 4.

The estimated fixed O&M costs are as follows:

Wet Tower	**$9.45/kW**
Dry Tower	**$9.45/kW**

The estimated variable O&M costs are as follows:

Wet Tower	**3.27 mills/Kwh**
Dry Tower	**3.26 mills/Kwh**

Attachment 1

Project Description

PB Power

PROJECT DESCRIPTION

1x1 Combined Cycle Plant

Overview

The capital cost of this facility was based upon a one on one, "F" class combined cycle plant located in Boise, Idaho. The facility includes: one natural gas fired combustion turbine generator (CTG), one heat recovery steam generator (HRSG) and one steam turbine generator (STG). The combined cycle facility was estimated with two cooling options: a conventional wet cooling tower and an air cooled condenser. The facility was assumed to be fueled by natural gas only, dual fuel capabilities were not included, nor was a black start generator.

The CTG is equipped with dry low NO_x combustor. Full load NO_x emissions at the CTG exhaust, upstream of the HRSG, is 25 ppm for the GE 7FB machine, on a volumetric dry basis (ppmvd) adjusted to 15 percent oxygen (O_2). A Selective Catalytic Reduction (SCR) catalyst system using 19 percent aqueous ammonia furnished with the HRSG will reduce combustion turbine exhaust NO_x. The SCR will be designed to limit NO_x emissions to 2.5 ppmvd adjusted to 15% O_2 during full load operation. An oxidation catalyst will also be installed to control emissions of volatile organic compounds (VOC) and carbon monoxide (CO).

Site Layout

The combined cycle facility will generally require 7 to 10 acres depending upon the cooling option selected. It was assumed that the HRSG was located outdoors. All other major equipment would be located indoors.

Power Generation Heat Cycle Overview

The thermodynamic cycle whereby air is compressed, heated by combustion of a fuel, and expanded to produce useful work is called the Brayton cycle. Combustion turbines compress air, heat the air in a combustion section, and then recover useful shaft power by passing the hot compressed air through an expander. The air compressor, expander, and generator are typically on a single shaft. Air is drawn through an inlet air filtration system, which removes dust and particulate matter larger than 10–15 microns. Particles larger than 10–15 microns damage turbine parts adversely affecting performance over time. The filtered air is compressed in the CTG compressor section. Compressed air then flows into the CTG combustion section.

Fuel is burned in the combustion section of the CTG at high pressure. Part of the compressed air is used for the combustion of the fuel. The balance of the compressed air is blended with the combustion products before it flows to the expander section of the CTG. The pressurized high

temperature gas leaving the combustor of an "F" class turbine is approximately 2,500°F. This hot gas passes through the expansion turbine, which converts expansion energy to shaft energy through the rotation of the turbine shaft. The turbine shaft drives both the air compressor and the generator. The CTG exhaust gas leaves the expansion turbine at approximately 1,150°F.

A second thermodynamic cycle, the Rankine cycle, recovers additional energy from the hot CTG exhaust gas. In this portion of the process, heat is captured to change water to steam, which is then expanded through a steam turbine to produce useful work. Heat is recovered from the downstream CTG exhaust gas by passing it through the HRSG to produce high-pressure steam for the steam turbine generator. This facility is referred to as a combined–cycle plant because it employs two classical thermodynamic cycles; the Brayton cycle (CTG) and the Rankine cycle (STG).

Major Mechanical Equipment

The following equipment list is based on the plant conceptual design.

TABLE 1
Major Mechanical Equipment List

Equipment/System	Qty	Size/Capacity	Service/Remarks
Combustion Turbine Generator	1	"F" Class	DLN combustion control, inlet spray mist cooling
HRSG (7FB)	1	1800 psig HP steam	Three pressures w/reheat
Cooling Tower OPTION	1		
Air Cooled Condenser (including deaeration) OPTION	1		Utilizes air to condense STG exhaust steam
Gas Compressors	2		
Aqueous Ammonia Storage Tank	1	12,000 gal	19 wt % ammonia solution for NO_x control
SCR System including Ammonia Injection Package	1	NO_x reduction	NO_x control
Oxidation Catalyst	1	CO reduction	VOC and CO control
HP Boiler Feed Water Pumps	3		HP Feed Water
Steam Turbine Generator	1	95 MW	Condensing reheat STG
Vacuum Condensate Pumps	2		Vertical (Two 100% capacity)
Fuel Gas Filter Separators	2		Natural gas fuel
HRSG Stack	1	19' dia 140' high	
Continuous Emissions Monitoring System (CEMS)	1	NOx, CO, and O_2	HRSG Stack

Combustion Turbine Generator (CTG)

The CTG converts the thermal energy produced by the combustion of natural gas into mechanical energy required to drive the generator and the CTG compressor.

Air is supplied to the CTG through an inlet air filter, inlet air evaporative cooling system, and associated air inlet ductwork. Downstream of the inlet air filters and the air cooling section, the air is compressed in the compressor section of the combustion turbine and then exits through the compressor discharge casing to the combustion chambers. Fuel is supplied to the combustion chambers where it is mixed with the compressed air and mixture is ignited. The high–temperature, pressurized gas produced by the combustion section expands through the turbine blades, driving the electric generator and the CTG compressor.

Exhaust gas from the CTG is directed through internally insulated ductwork to the HRSG. Steam generated in the HRSG is expanded through the steam turbine, which drives a generator to produce additional electric power.

Evaporative cooling is included on the inlet to the combustion turbine to enhance the output at higher ambient temperatures when the relative humidity is low.

The CTG system includes:

- One "F" class combustion turbine generators with inlet air evaporative cooling.
- The 7FB CTG includes dry low NO_x (DLN) combustors which limit the oxides of nitrogen in the combustion turbine exhaust to 25 ppmvd corrected to 15 percent oxygen.
- Starting package
- Electrical / control package
- Inlet air system, including silencer
- Inlet air evaporative cooling system
- Exhaust system
- Lube and hydraulic oil system
- Duplex lube oil coolers
- Gas fuel system
- Compressor wash system (on–line and off–line)
- Surge protection equipment
- Potential transformer cubicle
- Fire protection system

Heat Recovery Steam Generator (HRSG)

The HRSG uses heat from exhaust gases of the CTGs to produce steam. The steam drives the steam turbine, which turns a generator to produce electricity. The HRSG is designed and constructed to operate over the range of exhaust gas flows and temperatures resulting from CTG operation over the expected range of ambient air conditions and CTG loads.

The 7FB HRSG operates on sliding–pressure, three–pressure reheat type steam generators with horizontal gas flow. The HRSG includes feed water stop and check valves; steam stop valves; relief valves; continuous and intermittent blow down valves; NO_x control; and associated piping, valves, and instrumentation. The high pressure and intermediate pressure steam sections each consist of an economizer, evaporator, and superheat section. The low-pressure steam section consists of an economizer and evaporator.

The HRSG contains a selective catalytic reduction (SCR) system to reduce the concentration of nitrogen oxides to 2.5 ppmvd in the stack gas. The SCR catalyst will be located in the appropriate HRSG temperature zone for the catalyst type selected. Ammonia will be used as the reducing agent to convert NO_x into nitrogen gas and water vapor in the presence of the SCR catalyst. This project will use a 19 percent solution of aqueous ammonia and design for a maximum ammonia slip of 10 ppmvd in the stack gas at the end of the catalyst life.

The HRSG will also be provided with oxidation catalyst for the control of CTG emissions of VOC and CO. The catalyst promotes the oxidation of these VOC and CO emissions using excess oxygen in the turbine exhaust gas; no additional chemical reagents are required.

Steam Turbine Generator

Steam at 1,800 psig and 1,050°F from the 7 FB HRSG expands through the high-pressure section of the reheat steam turbine, driving the generator. Intermediate pressure steam returns to the HRSG from the steam turbine. Reheated steam flows back through the turbine continuing the expansion. Reheating the intermediate pressure steam improves the overall steam cycle efficiency.

Depending upon the cooling option, steam turbine exhaust steam is condensed into water by the deaerating air-cooled condenser or deaerating condenser and cooling tower and recycled back to the HRSG as boiler feed water. Small amounts of steam are added to deaerate the make up water.

Heat Rejection System

Depending upon the option, power cycle heat rejection is through either a cooling tower or an air-cooled condenser, which accepts the STG exhaust steam. The air-cooled condenser exchanges the heat inside the tubes by forcing ambient air over fins on the outside of the tubes transferring the heat to the air.

The condenser air removal system will have a hogging ejector to create an initial vacuum during startup and may employ either liquid ring vacuum pumps or a condensing ejection system to maintain a negative condenser pressure in normal operation. The condenser and its auxiliaries will be designed to accept steam turbine bypass flow during unit startup.

Plant auxiliary cooling for the cooling tower option would be provided by closed loop, auxiliary cooling, heat exchangers. The closed loop system would reject heat through a heat exchanger to the circulating cooling water. The auxiliary cooling for the air cooled condenser option would be provided by fin fan coolers (radiators).

Major Electrical Equipment

The electrical system will be designed to support a combined cycle power plant utilizing one combustion turbine generator set, one heat recovery steam generator and one steam turbine generator. The facility will supply electric energy to the Idaho Power grid. The main features of the electrical system components are described below.

High Voltage Substation

The high voltage substation will include circuit breakers (feeder breakers, sectionalizing breakers, and bus tie breakers), associated disconnect switches, bus bars, instrument transformers, take–off structures, metering and control facilities.

Generator Step–Up Transformers

Each generator step–up transformer will be a suitably sized two winding transformer per ANSI C57 with four no load taps in the high voltage winding. The high voltage winding will be connected solidly grounded wye and the low voltage winding will be connected in delta.

Iso–Phase Bus Duct

Power at 18 kV 60Hz, will be connected to each step–up transformer via a self cooled Iso–phase bus duct (per ANSI C37), in line with the generator circuit breaker.

Iso–phase cable tap boxes, connected to the two main runs of the iso–phase bus for each CTG, will be installed to supply each auxiliary power transformer. Each cable tap box will be connected to the auxiliary transformers via 25 kV rated cables.

The large GE7B machines will generate power at 18 kV.

Generator Circuit Breakers and Generator Synchronization

Each generator circuit breaker will be an SF6 breaker, in line with the generator bus, per ANSI C37 with dual trip coils and C800 CT's. The generator circuit breaker will allow for start up power to be back fed from the high voltage system through the generator's step–up transformer to the 18–4.16 kV auxiliary transformer.

The Load Commuting Inverter (LCI) static starting system initially "motors" the generator and accelerates it from turning gear speed to firing speed. Once the unit is fired and self–sustaining, the LCI is switched off.

Auxiliary Transformers

The 18.0–4.16 kV and 4.16–0.48 kV auxiliary transformers will be outdoors, oil filled transformers per ANSI C57 with four no load taps in the high voltage winding. The 4160 V

system will be grounded by a grounding resistor. The 480 V system will be high resistance grounded.

4160 V System

The 4160 V switchgear will provide power to all 4000 V motors and to the 4160–480 V, transformers. The 4160 V switchgear will be controlled from the DCS and will be used to feed the auxiliary, starting and excitation transformers. All 4000 V motors will be protected by relays.

480 V System

The 480 V switchgear will provide power to all motor control centers and all 480 V motors 100hp to 200hp, and will be located in the auxiliary substation. The 480 V switchgear will be controlled by the DCS. All 480 V motors, less than 100 hp, will be fed from the motor control centers (MCC's). All 480 V motors will be controlled from the DCS or the turbine control system.

Uninterruptable Power Systems (UPS)

The UPS will provide reliable power to the DCS and other critical instrumentation / power supply loads. The UPS will be fed from 480 VAC and 125 VDC station battery system. The UPS will be located in the electrical room

125 V DC System

A 125 VDC battery with dual battery charger will provide 125 Vdc power to the UPS, to the turbine emergency lube oil pumps and to the 125 Vdc distribution panels. The batteries and chargers will be located in the battery room The batteries will be sized for a 30 min UPS load and a 2-hour turbine emergency lube oil pump load.

Generator Metering and Relay Panels

The turbine protection, metering, controls and synchronizing, including the generator step–up transformer protective relays, and a main transformer differential relay will be supplied.

Balance of Plant Equipment

Fuel Gas System

The combustion turbine will burn natural gas as the primary fuel. From the pipeline natural gas will pass through a pressure control/metering station, compressed, and then pass through a gas filter separator before entering the combustion turbine.

Water Supply

Fire water, process water and potable water are assumed to be supplied to the facility through a pipeline at the site boundary. Raw water uses include:

- Supply to the DI system
- Service water
- Fire water
- Cooling tower make-up

Demineralized Water

The estimate is based upon the use of R/O and demineralizer treatment systems. These systems would be regenerated on site in a water treatment building. A demineralized water storage tank would provide backup and surge capacity to levelize out the demineralized water production requirements. Demineralized water is required for boiler makeup, wash water, and evaporative cooling supply water.

Firewater

Firewater is assumed to be supplied from a raw water source adjacent to the facility.

Plant Water Discharge System

Reject from the R/O system and blowdown from the HRSG will be routed to the cooling tower water basin or discharged directly to a sewer. Water will be collected from washdown, and equipment drains. These streams will be sent to an oily water separator prior to discharge to the plant waste water system. Gas turbine wash water will be collected in storage tanks for removal by wastewater disposal contractors.

Emissions Control

When operating above 50 percent of full load, dry low NO_x (DLN) combustion technology will limit the oxides of nitrogen (NO_x) in the GE 7FB combustion turbine exhaust to 25 parts per million, dry volume basis (ppmvd) corrected to 15 percent oxygen. Selective Catalytic Reduction

(SCR) represents the best available control technology (BACT) for additional NO_x control. The SCR system consists of the reduction catalyst and an aqueous ammonia injection system. NO_x in the 7FB HRSG stack gas will be reduced by the SCR system to a maximum of 2.5 ppmvd (adjusted to 15 percent oxygen on a dry volume basis).

An aqueous ammonia solution (approximately 19 wt percent) is vaporized and injected into the hot exhaust gas path of the HRSG at a point upstream of the SCR to assure uniform distribution over the catalyst. The ammonia and the NO_x chemically react on the SCR catalyst to form nitrogen gas and water vapor. The ammonia injection rate is controlled based on the measured operating parameters of the combustion turbine and exhaust gases at the stack. Ammonia slip at the exhaust stack will be controlled to 10 ppmvd or less depending on the operation of the ammonia injection system, catalyst conditions and temperature of the exhaust gas. It is expected that the selected SCR system will use a high activity catalyst on a metal, ceramic or zeolite extruded support structure. The SCR catalyst will be located within the HRSG in the optimum temperature range for effective NO_x reduction.

An oxidation catalyst will be provided in the 7FB HRSGs to limit carbon monoxide (CO) emissions to 6 ppmvd @ 15 percent O2) at full load and to ensure that emissions of volatile organic compounds (VOC) are controlled to less than 2 ppmvd @ 15 percent O_2) at full load. This catalytic system will promote the oxidation of CO to carbon dioxide and VOC to carbon dioxide and water vapor without the need for additional reagents such as ammonia.

Emission Monitoring

A continuous emissions monitoring system (CEMS) will be installed on the HRSG stack to sample, analyze, and record the concentrations of carbon monoxide, oxides of nitrogen, and diluent (oxygen/carbon dioxide) in the flue gas. The system generates a log of emissions data and provides alarm signals to the control room when the level of emissions exceeds pre–selected limits. The CEMS will comply with 40 CFR 60 and 40 CFR 75 requirements.

Aqueous Ammonia Handling and Storage

Aqueous ammonia (19 wt. percent solution in water) for NO_x emissions abatement will be delivered to the plant by tank trucks of up to 6,000-gallon capacity. One or two deliveries per month will be required to meet the plant requirements at continuous full load operation. Ammonia solution will be offloaded from the truck into a storage tank. This storage tank will be a standard horizontal cylindrical, atmospheric pressure API tank of approximately 12,000 gallons working capacity. A containment wall will be provided around the tank to contain the entire contents plus a freeboard allowance for rainfall or firewater accumulation. Aqueous ammonia

will be pumped from the storage tank to the ammonia vaporizer systems for injection into the SCR system. as previously described.

Hazardous Materials and Hazardous Waste Management

The storage, use, and handling of hazardous materials will be in accordance with operating procedures which meet the applicable laws, ordinances, regulations and standards, and include:

- Bulk chemicals stored in above–ground storage tanks while all other chemicals are stored in the original shipping container
- Chemical storage areas and feed/transfer areas equipped with secondary containment sufficient in size to contain the volume of the largest storage container or tank.
- Instructions and requirements for:
  - Hazardous materials, use and storage;
  - Emergency response;
  - Spill control and prevention;
  - Employee training; and
  - Reporting and record keeping.

The new power plant will generate wastes that are typical for the wastes generated at similar gas fired power plants. Spent SCR and CO catalysts will be returned to the suppliers for reclaiming and/or disposal. Hazardous wastes generated in the combined cycle plant will be temporarily stored in a hazardous waste storage area before transporting to an approved facility for final disposal.

Fire Protection

A firewater system for the combined cycle facility will be provided to limit personnel injury, and loss of life and property. The firewater system includes on site storage as well as both diesel and electric motor driven fire pumps. A firewater loop with monitors and other takeoffs will be installed to provide protection around the entire facility. The fire protection design basis will be a single risk area concept. The single risk assumes that only one fire is occurring at any time. The area of plant requiring the greatest degree of protection will be classified as the largest single fire risk area. The total fire water system demand shall be based on largest single fire demand for the power plant.

Codes and Standards

The following codes and standards will be used for the design of fire protection and detection systems as applicable:

- State and local fire code requirements
- Uniform Building Code (UBC)
- National Fire Protection Association (NFPA)
- NFPA 10 — Portable Fire Extinguisher
- NFPA 12 — Carbon Dioxide Extinguishing System
- NFPA 13 — Installation of Sprinkler System
- NFPA 14 — Standpipe and Hose System
- NFPA 15 — Water Spray Fixed System
- NFPA 24 — Installation of Private Fire Service Main
- NFPA 26 — Supervision of Valves Controlling Water Supplies for Fire Protection
- NFPA 30 — Flammable and Combustible Liquids Code
- NFPA 37 — Stationary Combustion Engines and Gas Turbines
- NFPA 70 — National Electrical Code (NEC)
- NFPA 72 — National Fire Alarm Code
- NFPA 850 — Electric Generating Plants (General guidance)
- NFPA 2001 — Clean Agent Fire Extinguishing System

Facility Safety

Safety showers and emergency eyewashes will be provided at all chemical treatment and storage areas, and the battery room. Activation of any of these fixtures will be annunciated in the control room.

Plant Control System

The Plant Control System will be a Distributed Control System (DCS) consisting of microprocessor–based controllers, redundant communications network and operator consoles. The DCS will provide continuous control, monitoring, alarming and trending for the plant. The DCS hardware will be based on a distributed architecture consisting of input/output modules, controllers, communication networks and human–machine interface (HMI).

The DCS controllers will provide all regulatory control and monitoring functions for the plant. The controllers will be redundant and will provide automatic, bump–less transfer to the backup in the event of a malfunction. All transfers to the backup will be transparent to the operators and will be alarmed on the operators console and the alarm printer.

The input/output modules may be located remote from the control room depending on final plant configuration. The input/output processors will communicate with controllers located in the electronic room of the control building.

The communications network will be redundant and will link all control and interface processors to the HMI. The communication network will be sized to handle all data transfers between the controllers and the HMI. Status of the communication network will be constantly monitored. Malfunction of a highway will result in an automatic transfer to the back–up highway without loss of data or plant disturbance. Highway malfunctions and transfers to the backup will be alarmed on the operator console and documented on the alarm printer.

The HMI for each unit will consist of one CRT based operator console located in the Control Room. The operator console will consist of three, color CRT stations and three keyboards with mouse. Two CTG controller CRTs and one STG controller CRT will also be located on the operator console. Space will be provided on the operator console for telephones and emergency shutdown switches.

One Engineer Workstation will be supplied with the DCS to perform control and display configurations. The Engineer Workstation will be located within the control room.

The DCS will be capable of providing Sequence of Events functions as part of the DCS hardware. Time stamping and printing of information will also be via the DCS.

Two printers will be provided with the operator console. The alarm printer will log all points that are in an alarm condition. Time, date, tag number and a description of the alarm will be part of the alarm printout. Acknowledge and alarm clear conditions will also be printed. In addition, the alarm printer will document all changes initiated by the operators. The color printer will provide a copy of color graphic displays and provide a record of current operating conditions.

Graphic and faceplate displays will be provided to enable the operator to have full visibility and control of the process. Display of alarm conditions and operating status will be provided to alert the operator of plant disturbances and hardware malfunctions.

Emergency shutdown switches will be installed on the operator console to permit shutdown of the gas turbines and the STG. The shutdown functions operate independently of the DCS.

The DCS will be interfaced with the CTG and STG suppliers' furnished control systems via data links to obtain all operating parameters of the CTG and STG. These data maybe displayed on the operator console CRT and will also be used for performance monitoring, alarming logging and trending.

Attachment 2

Capital Cost Estimates

PB Power

Project Cost Summary	Reference Cost	Estimated Cost	
I Specialized Equipment	72,432,550	79,675,805	USD
II Other Equipment	5,485,547	6,310,932	USD
III Civil	3,938,307	6,057,076	USD
IV Mechanical	9,366,870	11,821,891	USD
V Electrical	8,000,000	8,000,000	USD
VI Buildings & Structures	3,789,198	4,667,344	USD
VII Engineering & Plant Startup	10,529,000	10,544,980	USD
Subtotal - Contractor's Internal Cost	113,541,471	127,078,028	USD
VIII Contractor's Soft & Miscellaneous Costs	18,968,578	21,525,437	USD
Contractor's Price	132,510,049	148,603,465	USD
IX Owner's Soft & Miscellaneous Costs	19,925,904	24,374,312	USD
Total - Owner's Cost	152,435,954	172,977,777	USD
Net Plant Output	252.3	252.3	MW
Cost per kW - Contractor's	525	589	USD per kW
Cost per kW - Owner's	604	686	USD per kW

Total Plant (Reference Basis):	Reference Cost	Hours
Commodities	6,002,339	
Labor	8,488,058	297,215

Effective Labor Rates:	Cost per Hour
Civil Account	25.01
Mechanical Account	29.00
Electrical Account	30.00

Buildings	% of Total Cost	Estimated Cost	Hours
Labor	50	1,894,599	
Material	50	1,894,599	
Labor Hours			71,743

	Item Cost	Unit Cost	Quantity	Ref. Cost	Est. Cost	
1 Specialized Equipment				72,432,550	79,675,805	
1. Gas Turbine Package		38,642,150	1	38,642,150	42,506,365	
Combustion Turbine Genset	38,000,000					
Inlet Filter/Silencer System (w/ elements)						
Evaporative Cooling System	500,300					
Inlet Fogging System						
Exhaust Stack/Silencer System						
Electrical/Control/Instrumentation Package						
Gas Fuel Package						
Liquid Fuel Package						
Fuel Heating Package	141,850					
Steam Injection Package						
Water Injection Package						
Starting Package						
Lube Oil Package w/ main, auxiliary & emergency pump						
Compressor Water Wash System						
High Voltage Generator	0					
Transportation to Site						
2. Steam Turbine Package		15,500,000	1	15,500,000	17,050,000	
Turbine						
Generator						
Exhaust System						
Electrical/Control/Instrumentation Package						
Lube Oil Package w/ main, auxiliary & emergency pump						
High Voltage Generator						
Transportation to Site						
3. Heat Recovery Boiler		11,178,000	1	11,178,000	12,295,800	***** Middletown
Duct Burner & Burner Management System						
Gas Turbine Exhaust Transition						
Bypass Stack						
Main Stack	527,800					
Instrumentation						
SCR & Aqueous Ammonia System	1,588,000					
CO catalytic reactor for CO reduction	882,500					
Integral Deaerator						
Steam Vents & Water Drains						
Non-Return Valves						
Blowdown Recovery System						
Forced Circulation Pumps						
Transportation to Site						
4. Water-cooled Condenser		825,600	1	825,600	958,150	
Vacuum Pump						
Steam Jet Air Ejector						
Transportation to Site						
5. Air-cooled Condenser				0	0	
Tube Bundles						
Fans, Gears, and Motors						
Steam Duct & Condenser Piping						
Turbine Exhaust Transition						
Steam Jet Air Ejector						
Condensate Receiver Tank						
Support Structures						
Transportation to Site						
6. Inlet Air Chilling / Heating System				0	0	
Main Chiller Unit						
Chilling / Heating Water Coil						
Chiller Cooling System						
Transportation to Site						
7. Fuel Gas Compressor		391,450	2	782,900	841,190	
Fin Fan Cooling System						
Transportation to Site						
8. Continuous Emissions Monitoring System		302,500	1	302,500	332,750	
Enclosures						
Electronics, Display Units, Printers & Sensors						
Transportation to Site						
9. Distributed Control System		599,400	1	599,400	659,340	
Enclosures						
Electronics, Display Units, Printers & Sensors						
Transportation to Site						
10. Transmission Voltage Equipment		1,957,000	1	1,957,000	2,152,700	
Transformers	1,711,000					
Circuit Breakers	152,000					
Miscellaneous Equipment	93,150					
Transportation to Site						
11. Generating Voltage Equipment		2,645,000	1	2,645,000	2,909,500	
Generator Buswork	1,784,000					
Circuit Breakers	735,500					
Current Limiting Reactors						
Miscellaneous Equipment	125,950					
Transportation to Site						
12. User Defined		0	1	0	0	*****

	Unit Cost	Quantity	Ref. Cost	Est. Cost	
II Other Equipment			5,465,547	6,310,932	
1. Pumps			1,283,880	1,412,268	
Integral Feedwater Pump			0	0	
HP Feedwater Pump	152,650	3	457,950	503,745	
IP Feedwater Pump	45,160	3	135,480	149,028	
LP Feedwater Pump	83,950	3	251,850	277,035	
Condensate Forwarding Pump	30,120	2	60,240	66,264	
Condenser C.W. Pump	112,050	2	224,100	246,510	
Condenser Vacuum Pump	27,810	2	55,620	61,182	
Treated Water Pump	3,480	1	3,480	3,828	
Demin Water Pump			0	0	
Raw Water Pump 1	3,310	1	3,310	3,641	
Raw Water Pump 2	3,310	1	3,310	3,641	
Raw Water Pump 3			0	0	
GT Water Injection Pump			0	0	
GT Evap Cooler Water Pump			0	0	
Auxiliary Boiler Feedwater Pump			0	0	
Fuel Oil Unloading Pump				0	
Fuel Oil Forwarding Pump				0	
Aux Cooling Water Pump (closed loop)			0	0	
Diesel Fire Pump	42,980	2	85,960	94,556	
Electric Fire Pump			0	0	
Jockey Fire Pump	2,580	1	2,580	2,838	
GT Inlet Air Chiller/Heater Water Pump			0	0	
GT+Generator Lube Oil Coolant Pump			0	0	
GT Generator Lube Oil Coolant Pump			0	0	
GT Generator Cooling Pump			0	0	
GT Chiller Coolant Pump			0	0	
Fuel Compressor Coolant Pump			0	0	
ST+Generator Lube Oil Coolant Pump			0	0	
ST Generator Cooling Pump			0	0	
Aux Cooling Water Pump (open loop)			0	0	
2. Tanks		10	426,100	468,710	
Fuel Oil			0	0	
Hydrous Ammonia	45,910	1	45,910	50,501	
Demineralized Water	63,750	1	63,750	70,125	
Raw Water	63,750	1	63,750	70,125	
Neutralized Water	53,250	1	53,250	58,575	
Acid Storage	15,220	1	15,220	16,742	
Caustic Storage	15,220	1	15,220	16,742	
Waste Water			0	0	
Dedicated Fire Protection Water Storage	84,500	2	169,000	185,900	
3. Cooling Tower	1,350,000	1	1,350,000	1,485,000	*****GEA quote 052802
4. Auxiliary Heat Exchangers			0	45,845	
Auxiliary Cooling Water Heat Exchanger			0	0	
Auxiliary Cooling Tower			0	0	
GT+Generator Lube Oil Fin Fan Cooler			0	0	
GT Generator Lube Oil Fin Fan Cooler			0	0	
GT Generator Fin Fan Cooler			0	0	
GT Chiller Fin Fan Cooler			0	0	
Fuel Compressor Fin Fan Cooler			0	0	
ST+Generator Lube Oil Fin Fan Cooler			0	0	
ST Generator Fin Fan Cooler			0	0	
Miscellaneous Heat Exchangers			0	0	
5. Feedwater Heater(s)			0	0	
6. Auxiliary Boiler			0	0	
7. Makeup Water Treatment System	704,200	1	704,200	774,620	
8. Waste Water Treatment System	48,860	1	48,860	53,746	
9. Bridge Crane(s)		2	306,300	336,930	
Gas Turbine Crane	144,000	1	144,000	158,400	
Steam Turbine Crane	162,300	1	162,300	178,530	
10. Station/Instrument Air Compressors	27,770	2	55,540	61,094	
11. Recip Engine Genset(s)			0	217,000	
Emergency Generator			0	0	
Black Start Generator			0	0	
12. General Plant Instrumentation	155,400	1	155,400	170,940	
13. Medium Voltage Equipment	334,050	2	668,100	734,910	
Transformers	70,300				
Circuit Breakers	7,360				
Switchgear	108,050				
Motor Control Centers	132,450				
Miscellaneous	15,910				
14. Low Voltage Equipment	225,060	1	225,060	248,566	
Transformers	109,100				
Circuit Breakers	48,360				
Switchgear					
Motor Control Centers	57,700				
Miscellaneous	10,760				
15. Miscellaneous Equipment	261,217		261,217	300,621	
16. User-defined			0	0	

	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
III Civil	1,537,610	95,990	25.01			3,938,307	6,057,076
1. Site Work	928,500	25,610	25.00			1,468,750	1,784,331
Site Clearing							
Demolition							
Culverts & Drainage							
Erosion Control							
Fencing, Controlled Access Gates							
Finish Grading							
Finish Landscaping							
Material (Dirt, Sand, Stone)							
Waste Material Removal							
Obstacles R&R							
Miscellaneous							
2. Excavation & Backfill	103,430	1,920	25.00	7.49	20,214	151,382	179,224
Gas Turbine (1)	5.84	0.11	25.00	8.57	1,580	13,545	16,039
Steam Turbine (1)	5.85	0.11	25.00	8.59	822	7,061	8,360
Heat Recovery Boiler (1)	5.80	0.11	25.00	8.52	3,830	32,630	38,633
Water Cooled Condenser (1)	6.38	0.12	25.00	9.37	93	875	1,036
Cooling Tower	5.83	0.11	25.00	8.55	187	1,598	1,892
Air Cooled Condenser	0.00	0.00		0.00		0	0
Underground Piping	4.58	0.09	25.00	6.73	11,750	79,000	93,606
Switchyard	9.16	0.17	25.00	13.45	62	828	980
Miscellaneous	5.88	0.10	25.00	8.38	1,890	15,845	18,675
3. Concrete	500,750	66,801	25.00	320.60	6,771	2,170,775	2,827,904
Gas Turbine (1)	81.03	10.80	25.00	351.03	925	324,700	422,979
Steam Turbine (1)	89.20	11.89	25.00	386.45	1,000	386,450	503,420
Laydown pads:	81.01	10.33	25.00	339.32	41	13,990	18,196
Heat Recovery Boiler (1)	64.91	9.01	25.00	290.14	3,160	916,850	1,196,061
Water Cooled Condenser (1)	74.59	9.48	25.00	311.61	49	15,250	19,936
Cooling Tower	64.81	8.98	25.00	289.41	187	54,120	70,599
Air Cooled Condenser	0.00	0.00		0.00		0	0
Underground Piping:	81.76	10.43	25.00	342.51	19	6,535	8,499
Makeup Water Treatment System	101.36	12.39	25.00	411.07	21	8,760	11,375
Auxiliary Boiler (0)	0.00	0.00		0.00		0	0
Electrical Power Equipment	78.12	10.54	25.00	341.53	261	89,140	116,170
Inlet Chilling System (0)	0.00	0.00		0.00		0	0
Fuel Gas Compressor (2)	99.01	12.09	25.00	401.18	54	21,475	27,885
Pumps (9)	122.35	15.21	25.00	502.56	59	29,410	38,714
Auxiliary Heat Exchangers	0.00	0.00		0.00		0	0
Feedwater Heater(s) (0)	0.00	0.00		0.00		0	0
Station/Instrument Air Compressors (2)	110.61	13.48	25.00	447.50	18	7,970	10,348
Bridge Crane(s)	0.00	0.00		0.00		0	0
Recip Engine Genset(s) (0)	0.00	0.00		0.00		0	0
Tanks:	64.58	7.34	25.00	248.15	286	70,970	91,301
Switchyard	72.79	9.28	25.00	304.71	62	18,755	24,392
Miscellaneous	80.79	9.87	25.00	327.62	630	206,400	268,014
4. Roads, Parking, Walkways	104,830	1,659	25.66	2.24	65,868	147,400	173,357
Pavement, Curbing, Striping	1.18	0.02	25.00	1.73	65,850	113,800	134,666
Lighting	1,501.67	12.17	30.00	1,866.67	18	33,600	38,691
5. User-defined						0	0

NOTE: Individual items listed in III.2-4 are per unit quantity.

IV Mechanical	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
	4,050,039	183,339	29.00			9,366,870	11,821,891
1. On-Site Transportation & Rigging	890,700					890,700	1,097,120
2. Equipment Erection & Assembly	369,359	135,214	29.00			4,290,565	5,752,889
Gas Turbine Package	45,270	17,740	29.00	559,730	1	559,730	781,263
Steam Turbine Package	39,550	15,500	29.00	489,050	1	489,050	656,398
HRSG	194,000	76,000	29.00	2,398,000	1	2,398,000	3,218,554
Condenser	7,090	2,780	29.00	87,710	1	87,710	117,724
Cooling Tower				0		0	0
Makeup Water Treatment System	35,210	4,410	29.00	163,100	1	163,100	213,109
Auxiliary Boiler				0		0	0
Electrical Power Equipment	17,940	7,030	29.00	221,810		221,810	297,711
Inlet Chilling System				0		0	0
Fuel Gas Compressor	773	242	29.00	7,791	2	15,582	20,839
Pumps	5,120	2,010	29.00	63,410		63,410	85,110
Auxiliary Heat Exchangers				0		0	0
Feedwater Heater(s)				0		0	0
Station/Instrument Air Compressors	393	154	29.00	4,859		4,859	6,522
Bridge Crane(s)	1,800	706	29.00	22,274		22,274	29,896
Recip Engine Genset(s)				0		0	0
Miscellaneous	21,440	8,400	29.00	265,040		265,040	355,753
3. Piping	2,498,330	42,825	29.00	170.27	21,966	3,740,255	4,441,528
High Pressure Steam	366.83	12.48	29.00	728.81	419	305,370	415,872
Cold Reheat Steam	104.80	4.61	29.00	238.51	475	113,290	141,354
Hot Reheat Steam	544.77	12.61	29.00	910.33	449	408,740	492,866
Intermediate Pressure Steam	0.00	0.00		0.00		0	0
Low Pressure Steam	37.67	2.92	29.00	122.41	527	64,510	82,729
Other Steam	0.00	0.00		0.00		0	0
Circulating Water	216.63	2.70	29.00	294.85	938	276,570	323,560
Auxiliary Cooling Water	0.00	0.00		0.00		0	0
Feedwater	163.65	4.05	29.00	281.06	1,440	404,720	489,712
Other Water	19.84	1.19	29.00	54.37	1,520	82,640	104,735
GT Inlet Chilling/Heating System	0.00	0.00		0.00		0	0
Raw Water	36.11	0.37	29.00	46.90	1,570	73,636	85,462
Service Water	38.70	0.32	29.00	48.00	3,430	164,650	189,521
Waste Water	0.00	0.00		0.00		0	0
Allowance for gas connection	500,000.00	0.00		500,000.00	1	500,000	550,000
Steam/Water Sampling	0.00	0.00		0.00		0	0
Sanitary Water	0.00	0.00		0.00		0	0
Vents	0.00	0.00		0.00		0	0
Fuel Gas	121.33	2.74	29.00	200.84	2,360	473,980	570,818
Fuel Oil	0.00	0.00		0.00		0	0
Lube Oil	0.00	0.00		0.00		0	0
Compressed Air	0.00	0.00		0.00		0	0
GT Air Bleed	0.00	0.00		0.00		0	0
Service Air	6.61	0.75	29.00	28.50	2,570	73,250	95,400
	0.00	0.00		0.00		0	0
Vacuum Air	122.46	3.95	29.00	237.07	167	39,590	48,592
Trim	0.00	0.00		0.00		0	0
Chemical Feed	0.00	0.00		0.00		0	0
Nitrogen	0.00	0.00		0.00		0	0
Oxygen	0.00	0.00		0.00		0	0
Carbon Dioxide	0.00	0.00		0.00		0	0
Ammonia	18.73	1.22	29.00	54.01	346	18,689	23,775
Caustic	0.00	0.00		0.00		0	0
Acid	0.00	0.00		0.00		0	0
Boiler & Equipment Drain	83.59	0.25	29.00	90.82	429	38,963	43,677
Boiler Blowdown	78.95	1.76	29.00	129.85	429	55,707	67,632
Air Blowoff	0.00	0.00		0.00		0	0
Steam Blowoff	652.33	6.23	29.00	832.97	236	196,580	227,471
Chemical Cleaning	0.00	0.00		0.00		0	0
Heat Tracing	0.00	0.00		0.00		0	0
Fire Protection	58.50	0.45	29.00	71.55	3,000	214,650	246,431
Miscellaneous	85.84	1.92	29.00	141.40	1,660	234,720	283,492
4. Steel	291,650	5,300	29.00	2,516.10	177	445,350	530,385
Racks, Supports, Ladders, Walkways, Platforms	1,647.74	29.94	29.00	2,516.10	177	445,350	530,385
5. User-defined						0	0

NOTE: Individual items listed in IV.2-4 are per unit quantity.

	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
V Electrical	254,990	6,306	30.00			0,000,000	0,000,000
1. Assembly & Wiring	254,990	6,306	30.00			0	0
Switchgear	2,700	249	30.00	10,170.00	1	0	0
Motor Control Centers	207	19	30.00	790.87	23	0	0
Feeders	609	35	30.00	1,659.14	70	0	0
Medium/Low Voltage Cable Bus	4,407	66	30.00	6,396.30	27	0	0
Cable Tray	75,700	789	30.00	99,370.00	1	0	0
General Plant Instrumentation	305	4	30.00	426.70	227	0	0
Generator to Step-up Transformer Bus	127	160	30.00	4,911.50	2	0	0
Transformers	216	272	30.00	8,376.00	5	0	0
Circuit Breakers	40	50	30.00	1,539.67	6	0	0
Miscellaneous	16,700	447	30.00	30,110.00	1	0	0
2. User-defined						0,000,000	0,000,000

NOTE: Individual items listed in V.1 are per unit quantity.

	Area	Cost/Unit Area	Ref. Cost	Est. Cost
VI Buildings			3,789,198	4,667,344
1. Turbine Hall	29,958.0	103.60	3,000,049	3,695,310
2. Administration, Control Room, Machine Shop / Warehouse	12,400.0	61.47	762,228	938,874
3. Water Treatment System	236.6	61.66	14,589	17,970
4. Guard House	200.0	61.66	12,332	15,190
5. User-defined			0	0

	Ref. Cost	Est. Cost
VIII Soft & Miscellaneous Costs	38,894,482	45,899,749
1. Contractor's Soft Costs	18,968,578	21,525,437
Contingency:	9,939,530	11,310,498
Profit:	5,893,633	6,944,159
Permits, Licenses, Fees, Miscellaneous	0	0
Bonds and Insurance	1,135,415	1,270,780
Spare Parts & Materials	2,000,000	2,000,000
Contractor's Fee	0	0
2. Owner's Soft Costs	19,925,904	24,374,312
Permits, Licenses, Fees, Miscellaneous	1,000,000	1,000,000
Land Cost	0	0
Utility Connection Cost	7,000,000	7,000,000
Legal & Financial Costs	0	500,000
Interest During Construction	11,925,904	13,374,312
Spare Parts & Materials	0	1,000,000
Project Administration & Developer's Fee	0	1,500,000
3. Total User-defined Costs	0	0

Project Cost Summary	Reference Cost	Estimated Cost	
I Specialized Equipment	78,225,250	86,047,775	USD
II Other Equipment	3,641,400	4,234,230	USD
III Civil	4,378,854	6,609,785	USD
IV Mechanical	10,195,215	12,988,280	USD
V Electrical	8,500,000	8,500,000	USD
VI Buildings & Structures	3,723,401	4,586,299	USD
VII Engineering & Plant Startup	10,550,213	10,566,658	USD
Subtotal - Contractor's Internal Cost	119,214,332	133,533,026	USD
VIII Contractor's Soft & Miscellaneous Costs	20,019,327	22,794,567	USD
Contractor's Price	139,233,659	156,327,593	USD
IX Owner's Soft & Miscellaneous Costs	20,531,029	25,069,483	USD
Total - Owner's Cost	159,764,689	181,397,076	USD
Net Plant Output	249.0	249.0	MW
Cost per kW - Contractor's	559	628	USD per kW
Cost per kW - Owner's	642	729	USD per kW

Total Plant (Reference Basis):	Reference Cost	Hours
Commodities	6,239,390	
Labor	9,797,737	343,248

Effective Labor Rates:	Cost per Hour
Civil Account	25.01
Mechanical Account	29.00
Electrical Account	30.00

Buildings	% of Total Cost	Estimated Cost	Hours
Labor	50	1,861,700	
Material	50	1,861,700	
Labor Hours			70,495

	Item Cost	Unit Cost	Quantity	Ref. Cost	Est. Cost	
I Specialized Equipment				78,425,250	86,047,775	
1. Gas Turbine Package		38,642,150	1	38,642,150	42,506,365	*****
Combustion Turbine Genset	38,000,000					
Inlet Filter/Silencer System (w/ elements)						
Evaporative Cooling System	500,300					
Inlet Fogging System						
Exhaust Stack/Silencer System						
Electrical/Control/Instrumentation Package						
Gas Fuel Package						
Liquid Fuel Package						
Fuel Heating Package	141,850					
Steam Injection Package						
Water Injection Package						
Starting Package						
Lube Oil Package w/ main, auxiliary & emergency pump						
Compressor Water Wash System						
High Voltage Generator	0					
Transportation to Site						
2. Steam Turbine Package		15,500,000	1	15,500,000	17,050,000	
Turbine						
Generator						
Exhaust System						
Electrical/Control/Instrumentation Package						
Lube Oil Package w/ main, auxiliary & emergency pump						
High Voltage Generator						
Transportation to Site						
3. Heat Recovery Boiler		11,178,000	1	11,178,000	12,295,800	*****Middletown
Duct Burner & Burner Management System						
Gas Turbine Exhaust Transition						
Bypass Stack						
Main Stack	524,900					
Instrumentation						
SCR & Aqueous Ammonia System	1,500,000					
CO catalytic reactor for CO reduction	882,500					
Integral Deaerator						
Steam Vents & Water Drains						
Non-Return Valves						
Blowdown Recovery System						
Forced Circulation Pumps						
Transportation to Site						
4. Water-cooled Condenser				0	0	
Vacuum Pump						
Steam Jet Air Ejector						
Transportation to Site						
5. Air-cooled Condenser		6,754,000	1	6,754,000	7,429,400	**** Rumford
Tube Bundles						
Fans, Gears, and Motors						
Steam Duct & Condenser Piping						
Turbine Exhaust Transition						
Steam Jet Air Ejector						
Condensate Receiver Tank						
Support Structures						
Transportation to Site						
6. Inlet Air Chilling / Heating System				0	0	
Main Chiller Unit						
Chilling / Heating Water Coil						
Chiller Cooling System						
Transportation to Site						
7. Fuel Gas Compressor		391,450	2	782,900	861,190	
Fin Fan Cooling System						
Transportation to Site						
8. Continuous Emissions Monitoring System		302,500	1	302,500	332,750	
Enclosures						
Electronics, Display Units, Printers & Sensors						
Transportation to Site						
9. Distributed Control System		595,700	1	595,700	655,270	
Enclosures						
Electronics, Display Units, Printers & Sensors						
Transportation to Site						
10. Transmission Voltage Equipment		1,941,000	1	1,941,000	2,135,100	
Transformers	1,698,000					
Circuit Breakers	150,900					
Miscellaneous Equipment	92,450					
Transportation to Site						
11. Generating Voltage Equipment		2,529,000	1	2,529,000	2,781,900	
Generator Buswork	1,690,000					
Circuit Breakers	719,300					
Current Limiting Reactors						
Miscellaneous Equipment	120,450					
Transportation to Site						
12. User Defined		0	1	0	0	*****

	Unit Cost	Quantity	Ref. Cost	Est. Cost
II Other Equipment			3,641,400	4,234,290
1. Pumps			1,051,600	1,156,760
Integral Feedwater Pump			0	0
HP Feedwater Pump	152,650	3	457,950	503,745
IP Feedwater Pump	45,160	3	135,480	149,028
LP Feedwater Pump	83,950	3	251,850	277,035
Condensate Forwarding Pump	30,010	2	60,020	66,022
Condenser C.W. Pump			0	0
Condenser Vacuum Pump	23,830	2	47,660	52,426
Treated Water Pump	3,480	1	3,480	3,828
Demin Water Pump			0	0
Raw Water Pump 1	3,310	1	3,310	3,641
Raw Water Pump 2	3,310	1	3,310	3,641
Raw Water Pump 3			0	0
GT Water Injection Pump			0	0
GT Evap Cooler Water Pump			0	0
Auxiliary Boiler Feedwater Pump			0	0
Fuel Oil Unloading Pump				0
Fuel Oil Forwarding Pump				0
Aux Cooling Water Pump (closed loop)			0	0
Diesel Fire Pump	42,980	2	85,960	94,556
Electric Fire Pump			0	0
Jockey Fire Pump	2,580	1	2,580	2,838
GT Inlet Air Chiller/Heater Water Pump			0	0
GT+Generator Lube Oil Coolant Pump			0	0
GT Generator Lube Oil Coolant Pump			0	0
GT Generator Cooling Pump			0	0
GT Chiller Coolant Pump			0	0
Fuel Compressor Coolant Pump			0	0
ST+Generator Lube Oil Coolant Pump			0	0
ST Generator Cooling Pump			0	0
Aux Cooling Water Pump (open loop)			0	0
2. Tanks		10	426,100	468,710
Fuel Oil			0	0
Hydrous Ammonia	45,910	1	45,910	50,501
Demineralized Water	63,750	1	63,750	70,125
Raw Water	63,750	1	63,750	70,125
Neutralized Water	53,250	1	53,250	58,575
Acid Storage	15,220	1	15,220	16,742
Caustic Storage	15,220	1	15,220	16,742
Waste Water			0	0
Dedicated Fire Protection Water Storage	84,500	2	169,000	185,900
3. Cooling Tower		1	0	0
4. Auxiliary Heat Exchangers			0	0
Auxiliary Cooling Water Heat Exchanger			0	0
Auxiliary Cooling Tower			0	0
GT+Generator Lube Oil Fin Fan Cooler			0	0
GT Generator Lube Oil Fin Fan Cooler			0	0
GT Generator Fin Fan Cooler			0	0
GT Chiller Fin Fan Cooler			0	0
Fuel Compressor Fin Fan Cooler			0	0
ST+Generator Lube Oil Fin Fan Cooler			0	0
ST Generator Fin Fan Cooler			0	0
Miscellaneous Heat Exchangers			0	0
5. Feedwater Heater(s)			0	0
6. Auxiliary Boiler			0	0
7. Makeup Water Treatment System	704,200	1	704,200	774,620
8. Waste Water Treatment System	48,860	1	48,860	53,746
9. Bridge Crane(s)		2	306,900	336,930
Gas Turbine Crane	144,000	1	144,000	158,400
Steam Turbine Crane	162,300	1	162,300	178,530
10. Station/Instrument Air Compressors	27,770	2	55,540	61,094
11. Recip Engine Genset(s)			0	917,800
Emergency Generator			0	0
Black Start Generator			0	0
12. General Plant Instrumentation	151,450	1	151,450	166,595
13. Medium Voltage Equipment	302,800	1	302,800	333,080
Transformers	70,300			
Circuit Breakers	7,360			
Switchgear	103,800			
Motor Control Centers	106,900			
Miscellaneous	14,420			
14. Low Voltage Equipment	415,150	1	415,150	456,965
Transformers	176,700			
Circuit Breakers	95,850			
Switchgear				
Motor Control Centers	125,650			
Miscellaneous	19,910			
15. Miscellaneous Equipment	173,400		173,400	201,630
16. User-defined			0	0

III Civil	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
	1,754,811	104,908	25.01			4,378,854	6,809,785
1. Site Work	1,020,000	31,510	25.00			1,807,750	2,196,037
Site Clearing							
Demolition							
Culverts & Drainage							
Erosion Control							
Fencing, Controlled Access Gates							
Finish Grading							
Finish Landscaping							
Material (Dirt, Sand, Stone)							
Waste Material Removal							
Obstacles R&R							
Miscellaneous							
2. Excavation & Backfill	82,881	1,538	25.00	7.56	16,049	121,334	143,575
Gas Turbine (1)	5.84	0.11	25.00	8.57	1,580	13,545	16,039
Steam Turbine (1)	5.84	0.11	25.00	8.57	807	6,918	8,191
Heat Recovery Boiler (1)	5.80	0.11	25.00	8.52	3,780	32,205	38,133
Water Cooled Condenser (1)	0.00	0.00		0.00		0	0
Cooling Tower	0.00	0.00		0.00		0	0
Air Cooled Condenser	5.80	0.11	25.00	8.52	181	1,542	1,826
Underground Piping	4.47	0.08	25.00	6.57	8,130	53,400	63,210
Switchyard	9.22	0.17	25.00	13.54	61	824	975
Miscellaneous	5.99	0.10	25.00	8.54	1,510	12,900	15,204
3. Concrete	527,900	70,042	25.00	324.19	7,030	2,278,950	2,968,246
Gas Turbine (1)	81.03	10.80	25.00	351.03	925	324,700	422,979
Steam Turbine (1)	89.14	11.88	25.00	386.12	958	369,900	481,856
Laydown pads:	81.69	10.38	25.00	341.08	38	12,985	16,886
Heat Recovery Boiler (1)	64.90	9.01	25.00	290.23	3,110	902,600	1,177,508
Water Cooled Condenser (1)	0.00	0.00		0.00		0	0
Cooling Tower	0.00	0.00		0.00		0	0
Air Cooled Condenser	83.01	10.57	25.00	347.22	598	207,640	270,037
Underground Piping:	0.00	0.00		0.00	0	0	0
Makeup Water Treatment System	101.36	12.39	25.00	411.07	21	8,760	11,375
Auxiliary Boiler (0)	0.00	0.00		0.00		0	0
Electrical Power Equipment	81.72	11.03	25.00	357.48	262	93,660	122,064
Inlet Chilling System (0)	0.00	0.00		0.00		0	0
Fuel Gas Compressor (2)	99.01	12.09	25.00	401.18	54	21,475	27,885
Pumps (8)	125.46	15.82	25.00	521.03	43	22,425	29,154
Auxiliary Heat Exchangers	0.00	0.00		0.00		0	0
Feedwater Heater(s) (0)	0.00	0.00		0.00		0	0
Station/Instrument Air Compressors (2)	110.61	13.48	25.00	447.50	18	7,970	10,348
Bridge Crane(s)	0.00	0.00		0.00		0	0
Recip Engine Genset(s) (0)	0.00	0.00		0.00		0	0
Tanks:	64.58	7.34	25.00	248.15	286	70,970	91,901
Switchyard	72.99	9.29	25.00	305.19	61	18,565	24,143
Miscellaneous	82.01	9.97	25.00	331.25	656	217,300	282,112
4. Roads, Parking, Walkways	124,030	1,818	25.74	2.21	77,272	170,820	200,241
Pavement, Curbing, Striping	1.16	0.02	25.00	1.68	77,250	129,750	152,936
Lighting	1,501.36	12.18	30.00	1,866.82	22	41,070	47,296
5. User-defined						0	0

NOTE: Individual items listed in III.2-4 are per unit quantity.

	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
IV Mechanical	3,903,549	215,954	29.00			10,195,215	12,988,280
1. On-Site Transportation & Rigging	878,100					878,100	1,081,600
2. Equipment Erection & Assembly	462,479	171,724	29.00			5,442,475	7,436,951
Gas Turbine Package	45,270	17,740	29.00	559,730	1	559,730	751,263
Steam Turbine Package	38,620	15,130	29.00	477,390	1	477,390	640,745
HRSG	100,950	74,050	29.00	2,336,400	1	2,336,400	3,135,811
Condenser	98,200	38,480	29.00	1,214,120	1	1,214,120	1,629,577
Cooling Tower				0		0	0
Makeup Water Treatment System	35,210	4,410	29.00	163,100	1	163,100	213,109
Auxiliary Boiler				0		0	0
Electrical Power Equipment	20,360	7,980	29.00	251,780		251,780	337,937
Inlet Chilling System				0		0	0
Fuel Gas Compressor	773	242	29.00	7,791	2	15,582	20,839
Pumps	4,300	1,680	29.00	53,020		53,020	71,160
Auxiliary Heat Exchangers				0		0	0
Feedwater Heater(s)				0		0	0
Station/Instrument Air Compressors	393	154	29.00	4,859		4,859	6,522
Bridge Crane(s)	1,800	706	29.00	22,274		22,274	29,896
Recip Engine Genset(s)				0		0	0
Miscellaneous	27,830	10,910	29.00	344,220		344,220	462,011
3. Piping	2,276,670	40,020	29.00	163.17	21,065	3,437,250	4,056,748
High Pressure Steam	367.51	12.42	29.00	727.56	414	301,210	370,608
Cold Reheat Steam	104.94	4.60	29.00	238.21	470	111,960	138,662
Hot Reheat Steam	545.72	12.55	29.00	909.53	444	403,830	486,776
Intermediate Pressure Steam	0.00	0.00		0.00		0	0
Low Pressure Steam	37.73	2.92	29.00	122.50	520	63,700	81,685
Other Steam	0.00	0.00		0.00		0	0
Circulating Water	0.00	0.00		0.00		0	0
Auxiliary Cooling Water	0.00	0.00		0.00		0	0
Feedwater	165.42	4.06	29.00	283.26	1,420	402,230	486,544
Other Water	19.91	1.19	29.00	54.48	1,510	82,260	104,241
GT Inlet Chilling/Heating System	0.00	0.00		0.00		0	0
Raw Water	36.11	0.37	29.00	46.90	1,570	73,636	85,462
Service Water	38.70	0.32	29.00	48.00	3,430	164,650	189,521
Waste Water	0.00	0.00		0.00		0	0
Allowance for connection to gas line	500,000.00	0.00		500,000.00	1	500,000	550,000
Steam/Water Sampling	0.00	0.00		0.00		0	0
Sanitary Water	0.00	0.00		0.00		0	0
Vents	0.00	0.00		0.00		0	0
Fuel Gas	122.16	2.75	29.00	201.97	2,340	472,610	569,082
Fuel Oil	0.00	0.00		0.00		0	0
Lube Oil	0.00	0.00		0.00		0	0
Compressed Air	0.00	0.00		0.00		0	0
GT Air Bleed	0.00	0.00		0.00		0	0
Service Air	6.61	0.75	29.00	28.50	2,570	73,250	95,400
	0.00	0.00		0.00		0	0
Vacuum Air	69.03	2.72	29.00	147.81	339	50,109	62,158
Trim	0.00	0.00		0.00		0	0
Chemical Feed	0.00	0.00		0.00		0	0
Nitrogen	0.00	0.00		0.00		0	0
Oxygen	0.00	0.00		0.00		0	0
Carbon Dioxide	0.00	0.00		0.00		0	0
Ammonia	18.80	1.21	29.00	53.89	343	18,485	23,505
Caustic	0.00	0.00		0.00		0	0
Acid	0.00	0.00		0.00		0	0
Boiler & Equipment Drain	83.59	0.25	29.00	90.82	429	38,963	43,677
Boiler Blowdown	78.95	1.76	29.00	129.85	429	55,707	62,052
Air Blowoff	0.00	0.00		0.00		0	0
Steam Blowoff	652.33	6.23	29.00	832.97	236	196,580	229,471
Chemical Cleaning	0.00	0.00		0.00		0	0
Heat Tracing	0.00	0.00		0.00		0	0
Fire Protection	58.50	0.45	29.00	71.55	3,000	214,650	246,431
Miscellaneous	79.38	1.86	29.00	133.39	1,600	213,420	257,534
4. Steel	286,300	5,210	29.00	2,513.74	174	437,390	520,941
Racks, Supports, Ladders, Walkways, Platforms	1,645.40	29.94	29.00	2,513.74	174	437,390	520,941
5. User-defined						0	0

NOTE: Individual items listed in IV.2-4 are per unit quantity.

	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
V Electrical	**416,580**	**9,476**	**30.00**			**8,500,000**	**8,500,000**
1. Assembly & Wiring	**416,580**	**9,476**	**30.00**			**0**	**0**
Switchgear	2,600	223	30.00	9,290.00	1	0	0
Motor Control Centers	182	18	30.00	730.94	32	0	0
Feeders	911	47	30.00	2,309.55	89	0	0
Medium/Low Voltage Cable Bus	6,463	83	30.00	8,954.17	36	0	0
Cable Tray	96,600	999	30.00	126,570.00	1	0	0
General Plant Instrumentation	302	4	30.00	423.00	227	0	0
Generator to Step-up Transformer Bus	121	152	30.00	4,680.50	2	0	0
Transformers	183	232	30.00	7,133.33	6	0	0
Circuit Breakers	40	50	30.00	1,548.43	7	0	0
Miscellaneous	25,870	613	30.00	44,260.00	1	0	0
2. User-defined						**8,500,000**	**8,500,000**

NOTE: Individual items listed in V.1 are per unit quantity.

	Area	Cost/Unit Area	Ref. Cost	Est. Cost
VI Buildings			3,723,401	4,586,299
1. Turbine Hall	28,343.0	103.70	2,939,169	3,620,328
2. Administration, Control Room, Machine Shop / Warehouse	12,300.0	61.57	757,311	932,818
3. Water Treatment System	236.6	61.66	14,589	17,970
4. Guard House	200.0	61.66	12,332	18,190
5. User-defined			0	0

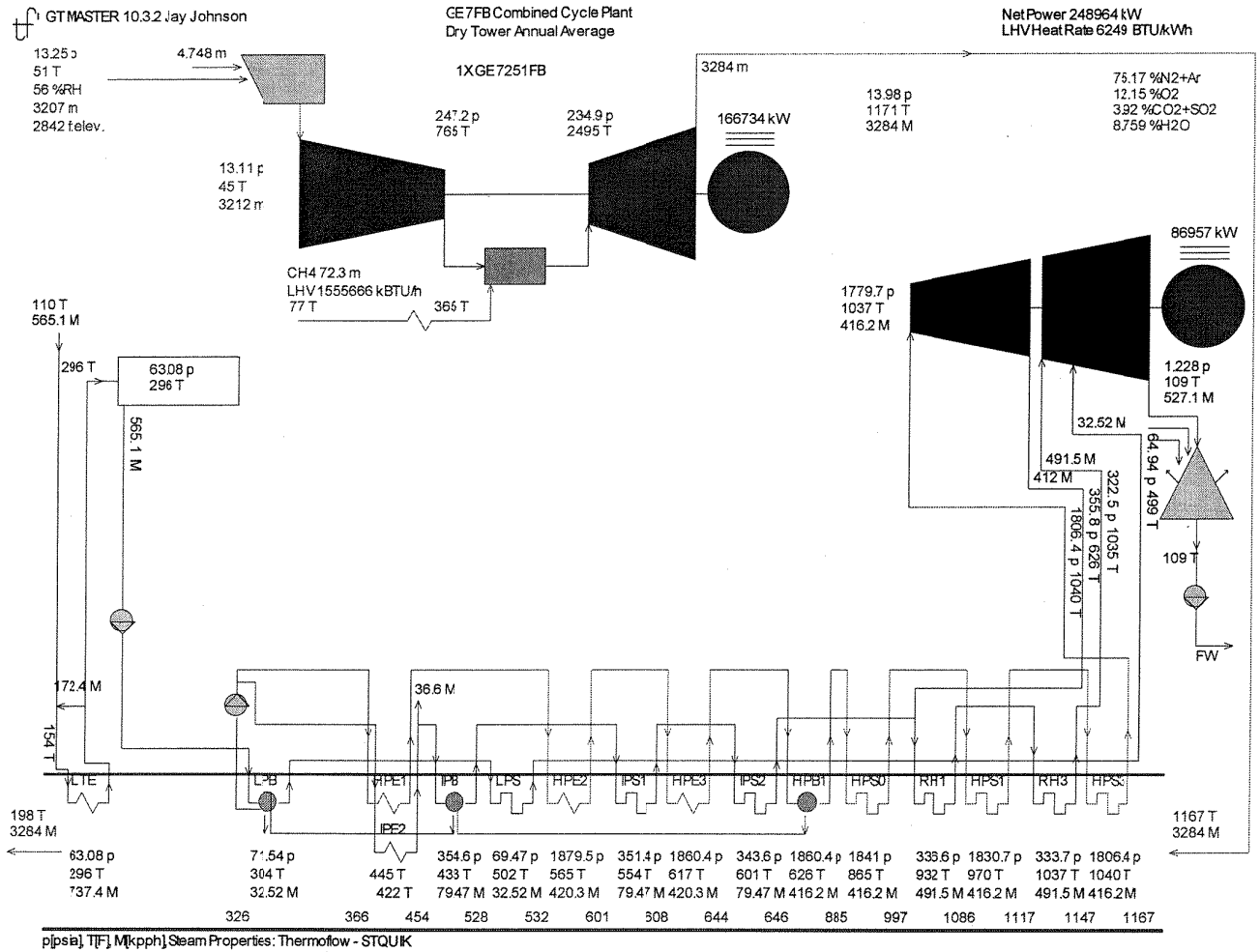
	Material	Labor Hours	Labor Rate	Unit Cost	Quantity	Ref. Cost	Est. Cost
VII Engineering & Startup	164,450	11,910	50.19			10,550,213	10,566,688
1. Engineering						9,788,000	9,788,000
2. Start-Up	164,450	11,910	50.19	762,213		762,213	778,688
3. User-defined						0	0

	Ref. Cost	Est. Cost
VIII Soft & Miscellaneous Costs	40,550,356	47,864,050
1. Contractor's Soft Costs	20,019,327	22,794,567
Contingency:	10,462,334	11,930,127
Profit:	6,364,849	7,529,109
Permits, Licenses, Fees, Miscellaneous	0	0
Bonds and Insurance	1,192,143	1,335,330
Spare Parts & Materials	2,000,000	2,000,000
Contractor's Fee	0	0
2. Owner's Soft Costs	20,531,029	25,069,483
Permits, Licenses, Fees, Miscellaneous	1,000,000	1,000,000
Land Cost	0	0
Utility Connection Cost	7,000,000	7,000,000
Legal & Financial Costs	0	500,000
Interest During Construction	12,531,029	14,069,483
Spare Parts & Materials	0	1,000,000
Project Administration & Developer's Fee	0	1,500,000
3. Total User-defined Costs	0	0

Attachment 3

Heat Balances

PB 100 YEARS
PB Power


GTMASTER 10.3.2 Jay Johnson
GE7FB Combined Cycle Plant
Dry Tower Annual Average
Net Power 248964 kW
LHV Heat Rate 6249 BTU/kWh
13.25 p
51 T
56 %RH
3207 m
2842 f.elev.
4.748 m
1XGE7251FB
247.2 p
765 T
234.9 p
2495 T
166734 kW
3284 m
13.98 p
1171 T
3284 M
75.17 %N2+Ar
12.15 %O2
3.92 %CO2+SO2
8.759 %H2O
13.11 p
45 T
3212 m
CH4 72.3 m
LHV 1555666 kBTU/h
77 T
365 T
86957 kW
1779.7 p
1037 T
416.2 M
110 T
565.1 M
296 T
63.08 p
296 T
565.1 M
1.228 p
109 T
527.1 M
32.52 M
491.5 M
412 M
64.94 p 499 T
322.5 p 1035 T
355.8 p 626 T
1806.4 p 1040 T
109 T
FW
172.4 M
154 T
36.6 M
LTE
LPB
HPE1
IPB
LPS
HPE2
IPS1
HPE3
IPS2
HPB1
HPS0
RH1
HPS1
RH3
HPS2
IPE2
198 T
3284 M
1167 T
3284 M
63.08 p
296 T
737.4 M
71.54 p
304 T
32.52 M
354.6 p
433 T
7947 M
69.47 p
502 T
32.52 M
1879.5 p
565 T
420.3 M
351.4 p
554 T
79.47 M
1860.4 p
617 T
420.3 M
343.6 p
601 T
79.47 M
1860.4 p
626 T
416.2 M
1841 p
865 T
416.2 M
333.6 p
932 T
491.5 M
1830.7 p
970 T
416.2 M
333.7 p
1037 T
491.5 M
1806.4 p
1040 T
416.2M
445 T
422 T
326
366
454
528
532
601
508
644
646
885
997
1086
1117
1147
1167
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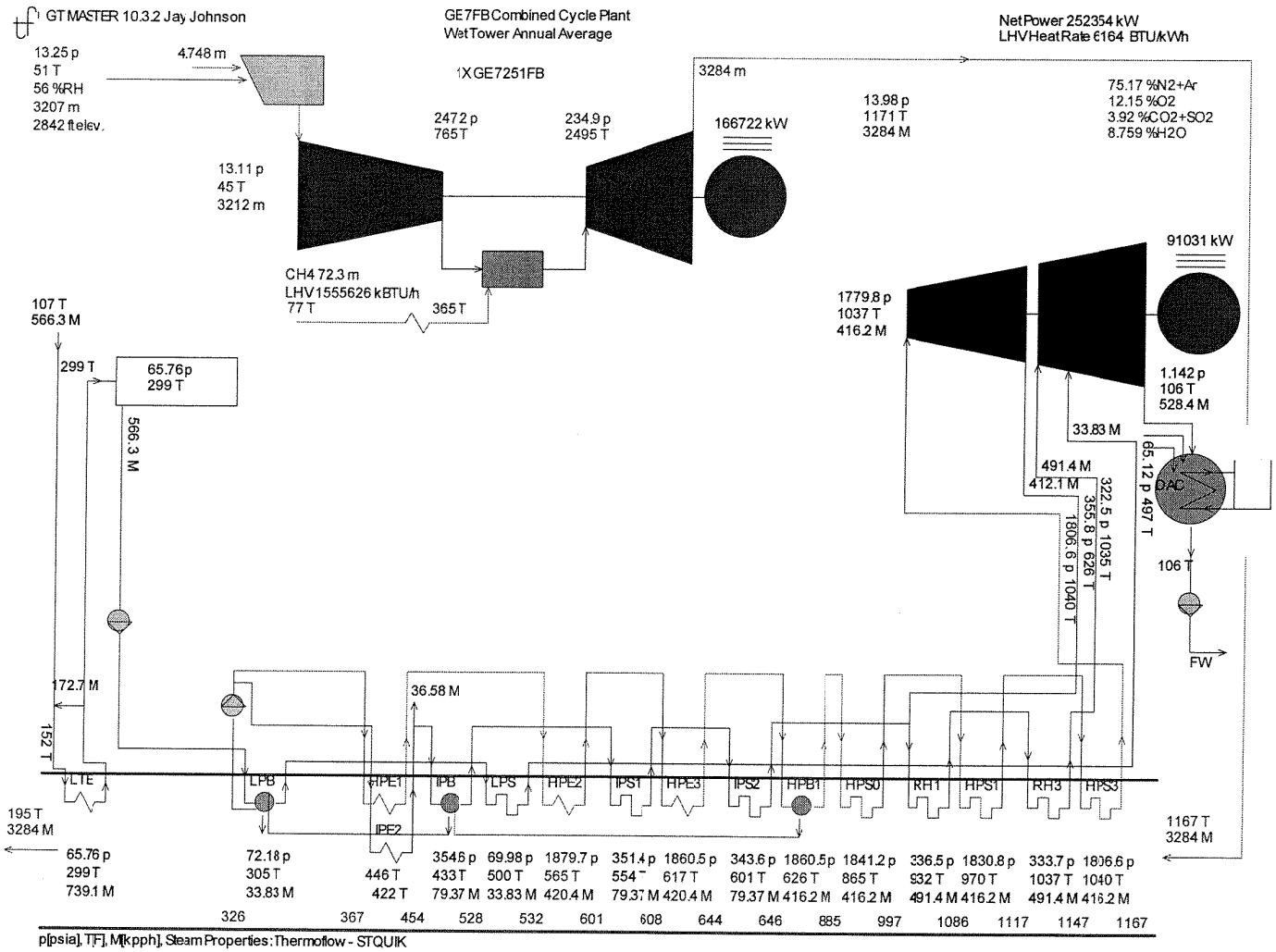
Idaho Power Boise, Idaho


GT MASTER 10.3.2 Jay Johnson
GE7FB Combined Cycle Plant
Wet Tower Annual Average
Net Power 252354 kW
LHV Heat Rate 6164 BTU/kWh
13.25 p
51 T
56 %RH
3207 m
2842 ft elev.
4.748 m
1 X GE7251FB
3284 m
13.98 p
1171 T
3284 M
75.17 %N2+Ar
12.15 %O2
3.92 %CO2+SO2
8.759 %H2O
2472 p
765 T
234.9 p
2495 T
166722 kW
13.11 p
45 T
3212 m
CH4 72.3 m
LHV 1555626 kBTU/h
77 T
365 T
91031 kW
1779.8 p
1037 T
416.2 M
1.142 p
106 T
528.4 M
107 T
566.3 M
299 T
65.76 p
299 T
566.3 M
33.83 M
491.4 M
412.1 M
65.12 p 497 T
322.5 p 1035 T
355.8 p 626 T
1806.6 p 1040 T
DAC
106 T
FW
172.7 M
152 T
36.58 M
LTE
LPB
HPE1
IPB
LPS
HPE2
IPS1
HPE3
IPS2
HPB1
HPS0
RH1
HPS1
RH3
HPS3
IPE2
195 T
3284 M
1167 T
3284 M
65.76 p
299 T
739.1 M
72.18 p
305 T
33.83 M
446 T
422 T
354.6 p
433 T
79.37 M
69.98 p
500 T
33.83 M
1879.7 p
565 T
420.4 M
351.4 p
554 T
79.37 M
1860.5 p
617 T
420.4 M
343.6 p
601 T
79.37 M
1860.5 p
626 T
416.2 M
1841.2 p
865 T
416.2 M
336.5 p
932 T
491.4 M
1830.8 p
970 T
416.2 M
333.7 p
1037 T
491.4 M
1806.6 p
1040 T
416.2 M
326
367
454
528
532
601
608
644
646
885
997
1086
1117
1147
1167
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Idaho Power Boise, Idaho

Attachment 4

O&M Cost Estimates

PB Power

IDAHO POWER

1 x 1 GE 7FB Combined Cycle Power Plant -- Air Cooled Condenser Option
Non-Fuel Operating and Maintenance Budget

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	25 Yr Totals	25 Yr Avg.
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50		
100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250		
8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059		
16,118	24,178	32,237	40,296	48,180	56,239	64,298	72,358	80,417	88,476	96,360	104,419	112,478	120,538	128,597	136,656	144,540	152,599	160,658	168,718	176,777	184,836	192,720	200,779		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16,118	24,178	32,237	40,296	48,180	56,239	64,298	72,358	80,417	88,476	96,360	104,419	112,478	120,538	128,597	136,656	144,540	152,599	160,658	168,718	176,777	184,836	192,720	200,779		
CI	HI	CI	CI	MI	CI	CI	HI	CI	CI	MI	CI	CI	HI	CI	CI	MI	CI	CI	HI	CI	CI	MI	CI		
2.53	1.34	4.03	4.03	1.38	4.03	4.03	1.84	4.03	4.03	1.38	4.03	4.03	1.84	4.03	4.03	1.38	4.03	4.03	1.84	4.03	4.03	1.38	4.03		
3.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50		
2.47	4.66	2.47	2.47	7.12	2.47	2.47	4.66	2.47	2.47	7.12	2.47	2.47	4.66	2.47	2.47	7.12	2.47	2.47	4.66	2.47	2.47	7.12	2.47		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0		
92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0		
4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040	4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040	4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040	4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040		
0	170,000	0	0	285,000	0	0	170,000	0	0	285,000	0	0	170,000	0	0	285,000	0	0	170,000	0	0	285,000	0		
4,634,040	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*4,634,040*	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*4,634,040*	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*4,634,040*	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*117,268,040*	*4,690,722*
190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000		
280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000		
40,000	40,000	40,000	40,000	40,000	400,000	40,000	40,000	40,000	40,000	40,000	40,000	400,000	40,000	40,000	40,000	40,000	40,000	40,000	400,000	40,000	40,000	40,000	40,000		
					500,000							500,000							500,000				0		
			1,800,000					1,800,000					1,800,000					1,800,000					0		
10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000		
520,000	*520,000*	*520,000*	*2,320,000*	*520,000*	*1,380,000*	*520,000*	*520,000*	*2,320,000*	*520,000*	*520,000*	*520,000*	*1,380,000*	*2,320,000*	*520,000*	*520,000*	*520,000*	*520,000*	*2,320,000*	*1,380,000*	*520,000*	*520,000*	*520,000*	*520,000*	*22,390,000*	*895,600*
480,000	320,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000		
15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000		
48,000	32,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000		27,520
15,000	10,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000		9,040
558,000	*377,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	8,174,000	326,960
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000		
15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000		
30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000		
42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500		
208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000		
100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000		
25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000		
590,500	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*	*590,500*		
6,302,540	*6,291,540*	*6,031,540*	*7,831,540*	*6,215,800*	*6,891,540*	*6,031,540*	*6,201,540*	*7,831,540*	*6,031,540*	*6,215,800*	*6,031,540*	*6,891,540*	*8,001,540*	*6,031,540*	*6,031,540*	*6,215,800*	*6,031,540*	*7,831,540*	*7,061,540*	*6,031,540*	*6,031,540*	*6,215,800*	*6,031,540*	162,594,540	6,503,782
1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000		
292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160		
120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000		
20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000		
100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000		
500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000		
2,360,160	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*59,004,000*	*2,360,160*
8,662,700	*8,651,700*	*8,391,700*	*10,191,700*	*8,575,960*	*9,251,700*	*8,391,700*	*8,561,700*	*10,191,700*	*8,391,700*	*8,575,960*	*8,391,700*	*9,251,700*	*10,361,700*	*8,391,700*	*8,391,700*	*8,575,960*	*8,391,700*	*10,191,700*	*9,421,700*	*8,391,700*	*8,391,700*	*8,575,960*	*8,391,700*	*221,598,540*	*8,863,942*
248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4	248.4		
16,118	24,178	32,237	40,296	48,180	56,239	64,298	72,358	80,417	88,476	96,360	104,419	112,478	120,538	128,597	136,656	144,540	152,599	160,658	168,718	176,777	184,836	192,720	200,779		
8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059		
2,001,905	2,001,905	2,001,905	2,001,905	1,958,386	2,001,905	2,001,905	2,001,905	2,001,905	2,001,905	1,958,386	2,001,905	2,001,905	2,001,905	2,001,905	2,001,905	1,958,386	2,001,905	2,001,905	2,001,905	2,001,905	2,001,905	1,958,386	2,001,905	49,873,553	1,994,942
$3.15	$3.14	$3.01	$3.91	$3.17	$3.44	$3.01	$3.10	$3.91	$3.01	$3.17	$3.01	$3.44	$4.00	$3.01	$3.01	$3.17	$3.01	$3.91	$3.53	$3.01	$3.01	$3.17	$3.01		3.26
$1.18	$1.18	$1.18	$1.18	$1.21	$1.18	$1.18	$1.18	$1.18	$1.18	$1.21	$1.18	$1.18	$1.18	$1.18	$1.18	$1.21	$1.18	$1.18	$1.18	$1.18	$1.18	$1.21	$1.18		1.18
$4.33	*$4.32*	*$4.19*	*$5.09*	*$4.38*	*$4.62*	*$4.19*	*$4.28*	*$5.09*	*$4.19*	*$4.38*	*$4.19*	*$4.62*	*$5.18*	*$4.19*	*$4.19*	*$4.38*	*$4.19*	*$5.09*	*$4.71*	*$4.19*	*$4.19*	*$4.38*	*$4.19*		*4.44*

Hours Factors Impacting Maintenance		
Type	Hours Factor	Multiplier
Fuel	Gas	1
	Oil	1.5
Peak Load		2
Water/ Steam Injection	Dry Control	1
	Wet Control	1.9

Starts Factors Impacting Maintenance	
Starts Factor	Multiplier
Trip from Full Load	8
Fast Load	2
Emergency Start	20

GE 7FB Inspection Intervals		
Type	Hours	Starts
Combustion (CI)	8,000	400
Hot Gas Path (HI)	24,000	900
Major (MI)	48,000	2,400

Notes:

1) The cost of the initial supply of spares is included in the capital cost of plant.

2) Client assumed to contract with GE for Long Term Maintenance Contract (LTMC).

3) Cost presented in 2002 dollars without escalation.

May 29, 2002

IDAHO POWER

1 x 1 GE 7FB Combined Cycle Power Plant -- Cooling Tower Option
Non-Fuel Operating and Maintenance Budget

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	25 Yr Totals	25 Yr Avg.
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50		
100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1,000	1,050	1,100	1,150	1,200	1,250		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
100	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**	**850**	**900**	**950**	**1,000**	**1,050**	**1,100**	**1,150**	**1,200**	**1,250**		
8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059		
16,118	24,178	32,237	40,296	48,180	56,239	64,298	72,358	80,417	88,476	96,360	104,419	112,478	120,538	128,597	136,656	144,540	152,599	160,658	168,718	176,777	184,836	192,720	200,779		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16,118	24,178	32,237	40,296	48,180	56,239	64,298	72,358	80,417	88,476	96,360	104,419	112,478	120,538	128,597	136,656	144,540	152,599	160,658	168,718	176,777	184,836	192,720	200,779		
CI	HI	CI	CI	MI	CI	CI	HI	CI	CI	MI	CI	CI	HI	CI	CI	MI	CI	CI	HI	CI	CI	MI	CI		
2.53	1.34	4.03	4.03	1.38	4.03	4.03	1.84	4.03	4.03	1.38	4.03	4.03	1.84	4.03	4.03	1.38	4.03	4.03	1.84	4.03	4.03	1.38	4.03		
3.00	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50		
2.47	4.66	2.47	2.47	7.12	2.47	2.47	4.66	2.47	2.47	7.12	2.47	2.47	4.66	2.47	2.47	7.12	2.47	2.47	4.66	2.47	2.47	7.12	2.47		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0		
92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0	92.0	92.0	92.0	92.0	90.0	92.0		
4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040	4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040	4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040	4,634,040	4,634,040	4,634,040	4,634,040	4,533,300	4,634,040		
0	170,000	0	0	285,000	0	0	170,000	0	0	285,000	0	0	170,000	0	0	285,000	0	0	170,000	0	0	285,000	0		
4,634,040	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*4,634,040*	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*4,634,040*	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*4,634,040*	*4,804,040*	*4,634,040*	*4,634,040*	*4,818,300*	*4,634,040*	*117,268,040*	*4,690,722*
190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000		
280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000		
40,000	40,000	40,000	40,000	40,000	400,000	40,000	40,000	40,000	40,000	40,000	40,000	400,000	40,000	40,000	40,000	40,000	40,000	40,000	400,000	40,000	40,000	40,000	40,000		
					500,000							500,000							500,000				0		
			1,800,000					1,800,000					1,800,000					1,800,000					0		
10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000		
520,000	*520,000*	*520,000*	*2,320,000*	*520,000*	*1,380,000*	*520,000*	*520,000*	*2,320,000*	*520,000*	*520,000*	*520,000*	*1,380,000*	*2,320,000*	*520,000*	*520,000*	*520,000*	*520,000*	*2,320,000*	*1,380,000*	*520,000*	*520,000*	*520,000*	*520,000*	*22,390,000*	*895,600*
480,000	320,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000		
15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000		
48,000	32,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000		27,520
15,000	10,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000		9,040
558,000	*377,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*287,000*	*8,174,000*	*326,960*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000		
15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000		
144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000		
42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500	42,500		
208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000	208,000		
100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000		
25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000		
704,500	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*	*704,500*		
6,416,540	*6,405,540*	*6,145,540*	*7,945,540*	*6,329,800*	*7,005,540*	*6,145,540*	*6,315,540*	*7,945,540*	*6,145,540*	*6,329,800*	*6,145,540*	*7,005,540*	*8,115,540*	*6,145,540*	*6,145,540*	*6,329,800*	*6,145,540*	*7,945,540*	*7,175,540*	*6,145,540*	*6,145,540*	*6,329,800*	*6,145,540*	*165,444,540*	*6,617,782*
1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000	1,328,000		
292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160	292,160		
120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000		
20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000		
100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000		
500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000		
2,360,160	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*2,360,160*	*59,004,000*	*2,360,160*
8,776,700	*8,765,700*	*8,505,700*	*10,305,700*	*8,689,960*	*9,365,700*	*8,505,700*	*8,675,700*	*10,305,700*	*8,505,700*	*8,689,960*	*8,505,700*	*9,365,700*	*10,475,700*	*8,505,700*	*8,505,700*	*8,689,960*	*8,505,700*	*10,305,700*	*9,535,700*	*8,505,700*	*8,505,700*	*8,689,960*	*8,505,700*	*224,448,540*	*8,977,942*
251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8	251.8		
16,118	24,178	32,237	40,296	48,180	56,239	64,298	72,358	80,417	88,476	96,360	104,419	112,478	120,538	128,597	136,656	144,540	152,599	160,658	168,718	176,777	184,836	192,720	200,779		
8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059	8,059	8,059	8,059	8,059	7,884	8,059		
2,029,307	2,029,307	2,029,307	2,029,307	1,985,191	2,029,307	2,029,307	2,029,307	2,029,307	2,029,307	1,985,191	2,029,307	2,029,307	2,029,307	2,029,307	2,029,307	1,985,191	2,029,307	2,029,307	2,029,307	2,029,307	2,029,307	1,985,191	2,029,307	50,556,203	2,022,248
$3.16	$3.16	$3.03	$3.92	$3.19	$3.45	$3.03	$3.11	$3.92	$3.03	$3.19	$3.03	$3.45	$4.00	$3.03	$3.03	$3.19	$3.03	$3.92	$3.54	$3.03	$3.03	$3.19	$3.03		3.27
$1.16	$1.16	$1.16	$1.16	$1.19	$1.16	$1.16	$1.16	$1.16	$1.16	$1.19	$1.16	$1.16	$1.16	$1.16	$1.16	$1.19	$1.16	$1.16	$1.16	$1.16	$1.16	$1.19	$1.16		1.17
$4.32	*$4.32*	*$4.19*	*$5.08*	*$4.38*	*$4.62*	*$4.19*	*$4.28*	*$5.08*	*$4.19*	*$4.38*	*$4.19*	*$4.62*	*$5.16*	*$4.19*	*$4.19*	*$4.38*	*$4.19*	*$5.08*	*$4.70*	*$4.19*	*$4.19*	*$4.38*	*$4.19*		*4.44*

Hours Factors Impacting Maintenance

Type	Hours Factor	Multiplier
Fuel	Gas	1
	Oil	1.5
Peak Load		2
Water/ Steam Injection	Dry Control	1
	Wet Control	1.9

Starts Factors Impacting Maintenance

Starts Factor	Multiplier
Trip from Full Load	8
Fast Load	2
Emergency Start	20

GE 7FB Inspection Intervals

Type	Hours	Starts
Combustion (CI)	8,000	400
Hot Gas Path (HI)	24,000	900
Major (MI)	48,000	2,400

Notes:

1) The cost of the initial supply of spares is included in the capital cost of plant.

2) Owner assumed to contract with GE for Long Term Maintenance Contract (LTMC).

3) Cost presented in 2002 dollars without escalation

May 29, 2002